

# Distortions to Agricultural Incentives in Mozambique

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## **Distortions to Agricultural Incentives in Mozambique**

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In recent decades, Mozambique has undergone enormous political and economic transformations. A colony of Portugal, the country moved to a phase of socialism after gaining independence in 1975 but, after economic collapse, in 1986 it started implementing a program of economic reform aimed at establishing a market economy in the country. During this period, Mozambique suffered an armed conflict. As a result of the conflict and other socio-economic transformations, production collapsed during much of the period to 1993. From 1994, and with the combination of peace, political stability, economic reform and large aid flows, the country shifted from being the poorest country in the world to achieving the highest growth rates in the region. Poverty rates have been significantly reduced and agricultural incomes have increased.

In Mozambique 75 percent of the population depends on agriculture for their livelihoods (Bias and Donovan 2003). For this reason, government interventions in the agricultural sector potentially have large impacts on many people's welfare. The purpose of this chapter is to analyze and measure such interventions for a group of agricultural products during the past three decades of economic transformation. We focus on whether interventions effectively tax or subsidize producers and processors of selected agricultural products. We do so by computing different measures of assistance, most notably the nominal rate of assistance to farmers (NRA) for the period 1975-2004. The products analyzed are the main cash and food crops: cotton, cashew, sugar, tobacco, cassava, maize, beans, rice and groundnuts. These products represent around two-thirds of the value of primary agriculture production in the country.

Despite a lack of data availability for some years regarding prices, margins and transport costs, the estimated coefficients suggest the existence of three clear periods regarding government intervention in the agriculture sector. In the first period,

when established fixed or minimum prices were imposed by central government, producers are clearly taxed in order to subsidize consumer prices. This period is followed by a process of price liberalization in the 1990s, where assistance measures become positive, mainly due to liberalization and the rationalization of import duties and taxes. In the third period (from the late 1990s) we observe an average reduction of assistance rates and an increase in their volatility (associated with large exchange rate depreciations in the presence of price sluggishness).

The chapter is organized as follows. In the next section, we briefly describe the agricultural sector in Mozambique. The main policy interventions in the past three decades in the sector are then summarized. The following section reports the main distortion measures used and the estimated rates of assistance. The reasons behind the evolution of policies in Mozambique are explored before, in the last section, we conclude by discussing prospects for further policy reform.

### **The agricultural sector in Mozambique's economy**

The recent history of Mozambique can be divided into four different periods based on the economic and political environments of the time (Wuyts 1978, 1984): a highly regulated and dependent colonial economy prior to independence; a central planning period following independence in 1975; a high-intensity war period involving economic collapse; and a post-war period characterized by policy reform, large aid flows and high rates of economic growth after the peace agreements. These periods can be clearly identified when analyzing agricultural development in Mozambique.

#### ***Prior to independence***

During this period, the monetized economy was equally divided into output from plantations, settlers and peasants. Production was highly specialized across provinces. For instance, Zambezia, a central province, specialized in plantation crops such as tea, copra, and sugar cane. Nampula, in the North, was the center of cashew and cotton

production, the two most important peasant cash crops, and it also produced most of Mozambique's sisal and tobacco.

Agriculture was highly regulated. Production of cash crops was structured around geographical concessions, where only specific crops could be cultivated, and there was a system of forced labor. Prices of production were fixed by negotiation between the colonial government, concession firms and farmers.<sup>1</sup> Agricultural commerce was carried out by a parastatal marketing board.

### ***1975 to 1986***

Immediately after independence, the massive emigration of the settler population and the concomitant capital flight generated large falls in production and marketed outputs. In 1976, the export value of agricultural crops decreases by 40 percent as compared to 1973. The then Liberation Front (FRELIMO) proceeded with nationalization of several firms, but, surprisingly, the emigration of former colonizers did not lead to land reform. In fact, instead of distributing freed land to peasants, the Government took over abandoned land which laid the foundation for the creation of large state farms in the years to come. State intervention in agriculture, mainly organized in large-scale productive units, rose to 52 percent of total production by 1982 (Hanlon 1984, Wuyts 1984).

The marginalization of the peasantry and the lack of structured state assistance contributed to the fall in production of both cash and food crops. Large investments to overturn the situation could not be financed from internal savings, and between 1975 and 1982 the monetary value of agricultural output fell by almost 30 percent.<sup>2</sup>

Agricultural policy during this period therefore can be characterized by an intensification of regulation in what was already a highly regulated sector, a suppression of private initiative, and a policy bias towards larger farms. Prices were fixed at all stages of the supply chain, and producer prices were set low in order to subsidize consumers. The setting of mandatory producer prices below market-clearing levels encouraged the emergence of parallel black markets from the early 1980s.

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<sup>1</sup> The colonial government would set producer and consumer prices, as well as marketing margins at all stages of production (Tarp 1990). These were negotiated with settlers' farm associations. Prices would vary according to province of origin and quality.

<sup>2</sup> Data in this section are drawn from the National Planning Commission (1994) cited in Tarp and Lau (1996)

### *1987 to 1994*

In 1987 the Economic Rehabilitation Program (ERP) began, and it made a clean break from past policies. Many official fixed prices for agricultural goods were liberalized and others became just minimum indicative prices. Private traders entered the commercialization system. This caused a marked increase in consumer prices in formal markets (by 182 percent in 1987 alone) in order to align with prices previously registered in parallel markets. State farms and other small and medium enterprises went through a vast program of privatization which concluded only at the end of the 1990s, in the attempt to re-launch production and reduce the debt burden of the state.

Despite the destabilizing effects of the on-going civil war, which isolated farmers from markets especially in the center-north of the country, production of key food and cash crops (cassava, maize, cotton, peanuts and beans) increased.

### *1994 to today*

With the signing of the peace agreement in 1992 and democratic elections in 1994, Mozambique entered into a new historical phase of high economic growth (7.8 percent from 1993 to 2004).<sup>3</sup> Agriculture benefited probably more than other sectors from the end of the war, since farmers could get back to their land and commercialization became easier, despite the fact that the destruction of major transport infrastructure contributed to the segmentation of the internal market into three distinct geographic regions (South, Center and North).

On average, real agricultural output grew of 6.2 percent between 1992 and 2004, slightly lower than real GDP average growth (7.8 percent). The importance of the agricultural sector as a share of GDP gradually reduced, to 23 percent by 2004, but agriculture still remains the key sector in terms of employment.

Basic food crops include cassava and maize grown mainly by smallholders (69 percent and 63 percent of total production – TIA 2002), cassava being the more

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<sup>3</sup> Average real growth rate during this period excluding large project investments in natural resources and aluminum is 6.5 percent, the poverty headcount index moved from 69 percent in 1996/97 to 54 percent in 2002/03, and agricultural incomes increased on average around 27 percent in the same period (Arndt, Jones and Tarp 2006).

important but mostly for subsistence consumption by producing households with very little marketed. Other major goods include rice, groundnuts and beans. Cash crops for smallholders include traditional ones, such as cotton, cashew and sugarcane, as well as “new” crops such as tobacco, oilseeds (sunflower, sesame, soybean) and spices (paprika, ginger). The percentage of farmers growing these new crops, despite being still limited, increased in the first part of the 1990s, signaling a possible diversification pattern confirmed by more-recent agricultural household surveys (*Trabalho de Inquerito Agrícola* -TIA 2002).

With the end of the armed conflict, the relative stabilization of the macroeconomic framework, and large inflows of foreign aid, the country had a propitious opportunity for the design of a long-term strategy for agricultural development. Unfortunately, Mozambique’s agricultural policy is still extremely fragmented and without a clear prioritization of objectives. Interventions seem to be more the heritage of past policies than the result of a new forward-looking strategy.

## **Policy interventions in agriculture**

In this section we describe the different policy instruments of intervention used by the government, both general and product-specific (for a more extensive overview see Bias and Donovan 2003).

### ***General policies***

#### ***Fixed/minimum prices***

Prior to independence, farmgate prices were regulated by the colonial government. These prices were established by a monopsonistic marketing board through which all commercial production had to be sold. This system continued after independence and throughout most of the war period. After independence, fixed prices for producers were set by the National Commission of Wages and Prices (CNPS), and all production had to be sold at the set price to AGRICOM, a parastatal marketing board, which then took care of distribution.

Prices began to be liberalized in the late 1980s, moving first from fixed to minimum prices, and soon afterwards were fully liberalized. Even though some minimum prices were introduced and were still present in the late 1990s, from 1996 they were only indicative. Currently, only cotton is regulated with an established minimum price for producers.

### *Commercialization*

Commercialization of agricultural products was carried out by a state monopsony during the colonial regime. After independence this same system continued, and the commercialization of all crops was controlled by AGRICOM, with the exception of cotton and cashew. AGRICOM was a state firm with a wholesale monopoly and regulated marketing margins.

In the early 1990s, trading was liberalized in agriculture and private traders started entering agriculture markets. Restrictions regarding product movements across districts and provinces, and the colonial system of official geographic monopolies for traders, were removed in the early 1990s.

### *Trade taxes*

During the colonial period the agricultural sector was extremely protected, and this high protection remained after independence and during the period of central planning.

Mozambique became a signatory of GATT in 1992 and a foundation member of the WTO in 1995, but started applying an MFN tariff structure from 1989. Since then, import duties have been reduced and simplified. Agricultural products are subject to a 20 percent tariff as of 2006, except for those products considered inputs or basic food products. Maize and rice pay just 2.5 percent and sugar pays 7.5 percent. Tobacco and cottonseeds pay also 2.5 percent. Other products such as cashew, cassava, beans, tea and groundnut pay 20 percent. Preferential trade to other SADC countries did not start for agricultural products in Mozambique until 2007.

One agricultural product, sugar, is also subject to a variable tariff surcharge that depends on the international price of sugar on top of the normal duty of 7.5 percent.<sup>4</sup>

Regarding export taxes, raw cashew exports were banned from 1976 to 1992 in order to supply cheap inputs to the local cashew-processing industry. Raw cashew exports were liberalized in early 1992 but an export tax, still in place, was introduced in place of the ban. The cotton sector has an export tax too, of 2-3 percent, aimed at financing the Cotton Institute (IAM).<sup>5</sup>

### *Taxes and subsidies to production*

Production subsidies have not been an instrument of intervention in Mozambique, and there are no records of any direct subsidies to production. The main tax is VAT (17 percent), which was introduced in 1998 to replace a consumption tax (5 percent). There are significant exemptions to VAT that affect agricultural products, including a total VAT exemption on seeds. Sugar imports are also VAT exempted. Nevertheless, the relevance of VAT for domestic production and sales is questionable. VAT is always levied on imports; however, most domestic production and retail sales of farm products do not pay any VAT. This implies that, *de facto*, VAT acts as a 17 percent import duty for agricultural products.

### *Extension services*

Most farmers do not receive any extension service. These are mainly concentrated in a few crops, such as cotton, cashew, tobacco and maize. In the case of cotton, these services are provided by the concessionary cotton company.<sup>6</sup>

### *Input policies*

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<sup>4</sup> In 2004, for instance, this surcharge amounted to figures close to 60 percent, although in 2006, due to higher international prices, the surcharge was zero and only the standard duty applied.

<sup>5</sup> The export tax is mainly oriented to finance part of the IAM functioning, and some extension research, pest control and other agricultural services. In practice, however, the supply of such services by the IAM has been quite minimal due to the lack of human and financial resources.

<sup>6</sup> Some analysts suggest that these services tend to be of poor quality (see for example Sequeira and Garrido 1999). Boughton et al. (2003) and Walker et al. (2003) found a very limited impact of these services on agricultural production and rural incomes (Walker et al. 2003). Some NGOs, such as World Vision and CARE, and some donor agencies, offer some extension services under specific programs for cotton, tobacco, maize and cashew in the North of Mozambique.



Small-scale agriculture in Mozambique typically does not use purchased inputs, with less than 10 percent of smallholder producers using any kind of purchased inputs. The main sectors that make use of them are cotton and sugar, which do so through cotton and sugar private concessions. Input markets in Mozambique are more or less non-existent, and it is only very recently that some private importers established in Mozambique. Two donor-funded programs financed most imports of inputs for agriculture during the 1980s and 1990s: the Mozambique Nordic Agriculture Program (1977-90), and most importantly, the Japanese KRII program (1987-97). These two programs provided finance for the purchase of machinery, fertilizers and pesticides. But input interventions are concentrated in very specific crops and producers and have had very little impact on total agricultural production, in part because they are carried out in a fragmented way by NGOs and donor-funded programs.

### ***Product-specific interventions***

The different products analyzed in this study can be grouped according to their degree of intervention.<sup>7</sup>

A first group of food crops formed by cassava, groundnut, beans, maize and rice have received hardly any government support or intervention. For this first group, the main type of government intervention is: (i) fixed and minimum pricing during the 1970s and 1980s, and (ii) duties and VAT on imports. Maize, rice and groundnuts (in a lower extent) had some support by donor funded programs and NGOs regarding extension services and improved seed varieties, this, however, obtaining mixed results.

A second group of products is tea and tobacco. These export cash crops have developed through government awarded concessions to private firms. Apart from designing and implementing the regulation relative to concessions, since the removal of minimum prices and the privatization of the tea plantations, no substantial government intervention could be identified in both sectors.

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<sup>7</sup> The main product specific interventions are described in Appendix 2, and Appendix 3 lists official interventions recorded at the government official bulletin (Boletín da República).

Finally, the last group includes three cash crops subject to heavy intervention: sugar, cotton and cashew. The sugar sector, after the privatization of the sugar plantations and mills, has been granted high protection and has received investment incentives such as duty and VAT exemptions for importing capital goods. The cotton sector is structured in a closed geographical concession system where farmers are forced to sell to the concessionary Ginning Company, and on exchange, they receive inputs and extension services on credit.<sup>8</sup> In the case of cashew, raw cashew exports were banned until 1991, and producer and factory gate prices were fixed since independence. In 1992, following World Bank suggestions, the sector was liberalized and raw cashew exports allowed through an export quota and subject to an export tax of 30 percent. In the following years, the quota was removed and the export tax was progressively reduced to 14 percent.

### *Summary of main interventions*

Government interventions in agriculture can be clustered in three different periods, as follows: A first period, from 1975 until 1987, of central planning, where large plantations, commercialization and processing firms were state owned. During this period, the main instruments of government intervention were fixed and minimum prices aimed to subsidize consumer prices.

The second period, from 1987 to 1998, was characterized by progressive price liberalization and privatization. In this period, prices and commercialization are gradually liberalized and the new tax structure started being introduced.

In the third period, from 1999 until now, government intervention is largely restricted to import duties and VAT, while some specific sectors are highly intervened: sugar via import surcharge, cashew through export tax, tobacco through geographical concessions and cotton through minimum prices and closed geographical concessions.<sup>9</sup>

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<sup>8</sup> In the late 1990s and the geographical concession system was opened. Following the liberalization of the concession system, some ginning companies started experiencing financial difficulties and a year later the open concession system was abolished.

<sup>9</sup> In 1999, a donor funded sector wide program for agriculture (PROAGRI) of around US\$ 200 millions was introduced. Although, it included support measures to extension and marketing, the program has been criticized for not having a significant impact on agriculture. The main objectives of PROAGRI are the following (Bias and Donovan 2003):

## Measuring agricultural policy distortions

The main purpose of this chapter is to measure the level of distortions induced by government policy interventions in the agricultural sector in Mozambique. The focus is on government-imposed distortions that create a gap between domestic prices and what they would be under free markets (Anderson et al. 2008). Since it is not possible to understand the characteristics of agricultural development with a sectoral view alone, the project's methodology not only estimates the effects of direct agricultural policy measures (including distortions in the foreign exchange market), but it also generates estimates of distortions in non-agricultural sectors for comparative evaluation.

More specifically, this study computes a Nominal Rate of Assistance (NRA) for farmers including an adjustment for direct interventions on tradable inputs (border protection on fertilizers) and on non-tradable inputs (credit subsidies to farmers). It also generates an NRA for nonagricultural tradables, for comparison with that for agricultural tradables via the calculation of a Relative Rate of Assistance (RRA – see Anderson et al. 2008).

### *Products selected*

The products selected for the analysis are maize, beans (*nhemba* and *butter*), groundnuts, rice, cashew, cotton, sugar and tobacco plus the non-traded staples led by cassava but also including sorghum, potato, yam and millet. The main criteria for selecting these products were their importance for agricultural production in Mozambique, so as to cover around 70 percent of the value of production in primary agriculture (Figure 2), but data availability also was a constraint. The traded products

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(i) To improve the productive capacity and productivity of agriculture, the family sector and the private sector using labor-intensive technologies and sustainable management of natural resources. (ii) Guarantee access to land and reduce associated bureaucracy (iii) Promote and facilitate the marketing of agricultural and livestock products, and also the access to markets (for factors of production as well as credit) (iv) Reduce the vulnerability of households and chronic food insecurity

are the main agricultural products in terms of exports, rural incomes and focus of government intervention.

Cassava is a non-tradable and complementary product to maize. It is grown by subsistence farmers, and while a low share of production is marketed it makes up close to half the value of farm production and is very important in the consumption of food by poor rural households (see Tarp et al. 2002). Groundnuts and beans are mainly produced in the center-north and traded in southern markets, where they compete with imports from South Africa. Most production of maize is carried out in the center-north, which registers some exports to Malawi, while in the south, Mozambican maize competes with imported maize mainly from South Africa. Rice is not extensively produced in Mozambique and there is only one rice mill in the south, which competes with Asian imported rice. In the center-north, paddy rice is milled and commercialized in small quantities by small scale processors.

Tobacco and cotton are export crops organized around concession systems. Sugar is grown in large plantations that control production and milling, and only recently outgrowing schemes have been introduced. Finally, cashew is mainly a food crop produced by small scale farmers. Part of the production, however, is commercialized for processing factories or export.

### *Data issues*

The main challenge in estimating any measure of assistance to agriculture in Mozambique is the lack of data. Data are scarce, and sometimes there are significant discrepancies among different sources.

Producer, wholesale and retail prices started to be collected from 1991 or 1994, depending on the crop, by the Agricultural Market Information System (SIMA) within the Ministry of Agriculture (MINAG). SIMA collects information in all the provinces of the country for several products. In the context of our sample, SIMA covers producer, wholesale and retail prices for maize, groundnuts (different types), beans (different types), cassava and rice.<sup>10</sup> In the case of sugar, data are only available from 1998 from the National Institute of Sugar (INA). Cotton and Cashew have long

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<sup>10</sup> SIMA prices data are collected in a large number of markets, at least two or three markets for each province. This implies that average prices are representative in geographical coverage, although they have not been weighted with provincial consumption shares.

historical series of prices from the Institute of Cotton (IAM) and INCAJU. This latter are also reported in McMillan, Horn and Rodrik (2003).

The main problem for most products, with the exception of cashew and cotton, is the lack of price data for the 1970s and 1980s. However, this period is characterized by regulated prices, and therefore we use government established fixed and minimum prices based on Tarp (1990) and MINAG (1993). These prices tend to reflect accurate producer and retail prices until the early or mid-1980s. From the mid-1980s to the years of price liberalization, however, black markets became more and more important. This means that producers and retailers received higher prices and we may be underestimating domestic prices and overestimating the degree of taxation as expressed by the NRA estimates for this period.<sup>11</sup>

For the case of cotton, this problem is present during the whole period of the study. There is evidence that some cotton companies pay prices different from the agreed price to farmers, reflecting production incentives and transport costs. Nevertheless, these price differentials are not very substantial.

For international reference prices we use c.i.f. import unit values, if the product is importable, or f.o.b. export unit values, when exportable. When c.i.f. import unit values from the rest of the world are not available, we use South African export unit values applying a c.i.f. adjustment, since most imports in Mozambique come from South Africa anyway.

We need to adjust prices for margins in order for them to be comparable. In the case of import-competing products, we assume that commercialization margins are equal for imported and domestic products, and we then adjust both prices with transport costs. In order to do this, we inflate both prices using data on domestic transport costs for maize available from SIMA from 2001 to 2005. We take as the point of comparison the city of Maputo, the largest market in the country. Thus, we compute the average transport costs from all the provinces of the country to Maputo and from the border with South Africa and Swaziland to Maputo, for the period 2001-05. We then add this transport cost coefficient as percentage of producer price and as percentage of c.i.f. unit values to inflate the prices when we calculate the NRA. We apply this kind of adjustment to maize, groundnuts and beans.<sup>12</sup> For rice and sugar,

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<sup>11</sup> In addition, we have some missing observations for some products for the early 1990s.

<sup>12</sup> Three issues have to be taken into account when doing this. First, not all production is sold in Maputo; a significant amount is commercialized in central and northern provincial markets. Second,

we apply transport cost adjustments available specifically for these products (also from SIMA).

In the case of export products, we need to calculate the margin and transport cost adjustment to the border. For cotton it is not required, since cotton lint is exported by cotton processors directly so there is no intermediary involved. For cashew, we use the margins for traders suggested in McMillan, Horn and Rodrik (2003), 50 percent on producer price and 40 percent on processor price. For maize, we use the average of transport costs from Center-North region to Malawi as percentage of price from 2001 and 2005 as transport costs plus a 30 percent trader margin as suggested by MIC (2001).

For nontradable staple foods, we take prices and quantities from the FAO database, and assume their NRAs are zero.

The exchange rate was liberalized in the early 1990s very gradually, and some capital controls still remain. Following Anderson et al. (2008) we use a weighted average between the official and the parallel exchange rate, as the equilibrium exchange rate that would prevail in the absence of any distortions.

## ***Results***

The NRA five-year average estimates are tabulated in Tables 1 and 2, and shown in Figures 3 and 4. To compute the NRA measures we use, whenever data are available, a measure based on averages taken during commercialization (post-harvest) periods, and when this is not possible, we use yearly average producer prices.<sup>13</sup>

In the case of import-competing products, the results show a very clear common pattern in NRA values for all products (Figure 3). In this pattern, we can identify the different periods described earlier. In the first period, 1976-90 of fixed and minimum pricing, NRA coefficients are highly negative, reflecting the government goal of subsidizing consumer prices via low fixed producer prices and

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transport costs for maize do not necessarily reflect costs of other products. Third, we assume a constant transport cost ratio between border-Maputo and rest of the country-Maputo through time. Nevertheless, and despite these strong assumptions, what is relevant when using this approach is the accuracy of the ratio between the two price adjustment coefficients. This ratio should also approximate the ratio of transporting another product from a remote farm to a central provincial market with respect the transport costs from the nearest port to the same market.

<sup>13</sup> For most products, NRA values are higher when yearly averages are taken due to higher producer prices experienced during off season. This may be misleading since in the absence of storage infrastructure, prices that most producers receive are likely to be the prices recorded during post harvest periods.

fixed margins. These negative NRA values continue until the early 1990s, but we are overestimating the degree of taxation expressed by the NRA by the end of this period: the lack of market producer prices required us to use government-established minimum prices, which are likely to be below actual prices received by producers.

The second period, 1991-97, is the period of price liberalization, and in our estimations we shift from using minimum to collected producer prices (SIMA). For the reasons underlined above, it is likely that the rise in the NRA that we observe from 1990 actually began a couple of years earlier. During this period, domestic prices rose in order to achieve market-clearing conditions. Furthermore, NRA coefficients start becoming positive due to the introduction of taxes on imports and exports.

The third period shows a peak for the NRA in 1998, and fluctuates around positive values that mainly reflect import duties. Note that volatility increases in this period. Such an increase, when using observed producer prices, is consistent with the experiences of other countries in the Africa region.

NRA rates seem to oscillate during the period 1995-2000 around the value of the import tariff, plus the VAT in some cases.<sup>14</sup> Nevertheless, the average NRA estimates for 2001-03 decrease significantly. The fact that there is a lack of government intervention in the sector implies that the actual NRA values should theoretically converge to import tariffs and VAT rates. Thus, the differences observed may well correspond to measurement errors.

The case of exportable goods seems to be slightly different from import-competing products. Despite the trend of shifting from a negative NRA towards zero with the process of price liberalization, the trend after the 1990s is different across products. In the case of exportable maize in central and northern regions, the trend is to converge to the expected zero NRA due to absence of intervention, while for cotton lint it converges to the export tax. For cashew and tobacco, NRA estimates remain negative for longer.

### ***Evolution of NRAs by product***

#### ***Maize***

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<sup>14</sup> VAT is not paid along the value chain of agricultural products, from the farm to the market, since small businesses are not required to charge VAT. Nevertheless, unless the product is exempted, VAT is always paid at the border and, therefore, acts de facto as an import tariff.

Maize is a product imported in the southern region, while being exported from the Center and the North of the country. High transport costs make trading maize from north to south not profitable, and maize surplus is therefore exported to Malawi, while the deficit in the South is largely covered by maize from South Africa. For this reason, we compute the NRA at these regional levels.

In the South, where maize is importable, the NRA follows the trend described in the previous section for import-competing products. In the first phase, there is a negative NRA due to fixed and minimum pricing with the objective of subsidizing consumer prices in urban areas. In the second phase, prices are liberalized and the NRA becomes positive, tending to converge to the import tariff. The final period is characterized by high volatility of the NRA. However, in the absence of other policy interventions, the actual NRA should lie around the import tariff plus VAT rate.

In the Center-North, where maize is exportable, the picture is quite different. Our estimates, accounting for fixed transport costs and trading margins of around 41 percent, indicate a negative NRA during most of the period before 1990 of between -55 and -60 percent. For the period since then, we assume a zero NRA in the absence of government intervention after price liberalization.

### *Beans*

There are two main types of beans produced in Mozambique, *nhemba* and *butter*. Beans are mainly produced in the Center-North and the quantities commercialized are mainly consumed in the South. The fact that *nhemba* beans are a domestic variety simplifies the calculations. There are no possible reference prices for this type of bean, since it is only produced in Mozambique, and therefore, in the absence of intervention, the NRA can be assumed to be zero. In the case of *butter* beans, they compete with beans imported from South Africa. For the period for which we have data, the NRA following price liberalization is close to the tariff and VAT rate of 46 percent.

### *Rice*

Rice in Mozambique is mainly produced by small-scale farmers. More than 75 percent of production is concentrated in the center-north of the country. Rice produced in the South is milled in the only existing industrial mill in the country,



while the rice produced in the Center-North is milled directly by farmers and then sold. In this case, producer and processor prices coincide. The trend of the NRA for this product is similar to the rest of import-competing crops, from highly negative in the early period shifts towards positive rates similar to the import tariff plus VAT.

### *Tobacco*

Tobacco is an export crop organized in a system of geographical concessions, first state-owned and then private. The NRA was more than -50 percent before liberalization, and thereafter converges to zero.

### *Cotton*

Cotton is a very important activity in rural areas and is highly regulated. Table 2 shows a highly negative NRA for cotton producers, but with a highly positive trend following the privatization of the ginning sector, when ginners were allowed to export directly to the international market. The lack of quality adjustment may explain some of the price differential, but the result seems to be consistent with the findings by Boughton et al. (2003) of low quality and also very low producer prices in Mozambique compared to other African countries.

### *Cashew*

The cashew sector has been the subject of intense debate in the last two decades. This is one of the main crops in Northern Provinces and the processing industry was traditionally one of the main sources of industrial employment, and after the reform many of the processing unions were forced to close down, unable to compete with prices offered by traders that export raw cashew for processing in India.

These reforms can be easily identified in the NRA evolution. In the case of cashew producers, after independence, and with the export ban, NRAs are negative and very high, indicating a large tax on producers to subsidize the processing industry with cheap raw cashews. Following the replacement of the export ban with an export tax, the NRA became less negative. The gap between producer price and border price, once controlled for the traders' margin, narrowed considerably over the 1990s and the NRA tends to converge on average to the export tax.

### *Sugar*

Sugar is a very important focus of government support in terms of agro industrial policy. The structure of the sector, where processors control production, implies that the relevant support measure for sugar is the processor NRA.<sup>15</sup> This product has been considered exportable from 1975 to 1982 and importable afterwards.<sup>16</sup> During the 1970s the sector was nationalized, and it operated with state-owned plantations that were privatized in the 1990s. This is represented by a negative NRA during the period until prices were liberalized and farms privatized. Then import tariffs became the main influence on the NRA.

### *Aggregate NRAs and the RRA*

The NRAs for covered agricultural products as a whole move from around -50 percent in the period to 1990 to an average of zero in the 1990s and to just above zero in the present decade. If we assume non-covered products are not distorted (since many of them are nontraded horticultural and livestock products), the overall NRAs for the farm sector are somewhat closer to zero. The NRA for just tradable farm products is however very negative prior to the 1990s' liberalization. When that is compared with the positive NRA for tradable non-agricultural products, by way of computing the relative rate of assistance, the RRA is highly negative until the reforms begin to make their mark in the 1990s, and then converges to zero and even becomes slightly positive after 2000 (Table 2 and Figure 3).

The final set of rows in Table 2 shows what the distortion indicators would have been had the distortions to exchange rates not been taken into account. They suggest that less than one-eighth of the RRA in the 1980s was due just to exchange rate distortions, and that influence has since disappeared.

### **Conclusions and prospects for further policy reform**

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<sup>15</sup> For the NRA aggregation we assume full pass-through of the distortion to sugar cane farmers

<sup>16</sup> With the rehabilitation program in the 1990s and the protection granted to the domestic market, production increased but is oriented towards the national market (relatively profitable), where Mozambique's sugar competes mainly with sugar from South Africa or Swaziland. Exports are growing but are limited to the more profitable preferential markets in the EU and the United States.

The agricultural sector in Mozambique has undergone a process of progressive liberalization and elimination of government intervention. The country shifted from central planning, concession systems and the use of fixed and minimum pricing in the ten years after independence towards a market economy from the early 1990s. Since those economic reforms began, government intervention has been minimal and based mainly on the use of import tariffs, with the exception of cotton, cashew and sugar where more complex policies have been implemented. Sugar now has a large positive NRA based on a very high import surcharge. While this is not unlike many other countries, the government nonetheless could explore other, less-distortionary forms of assistance.

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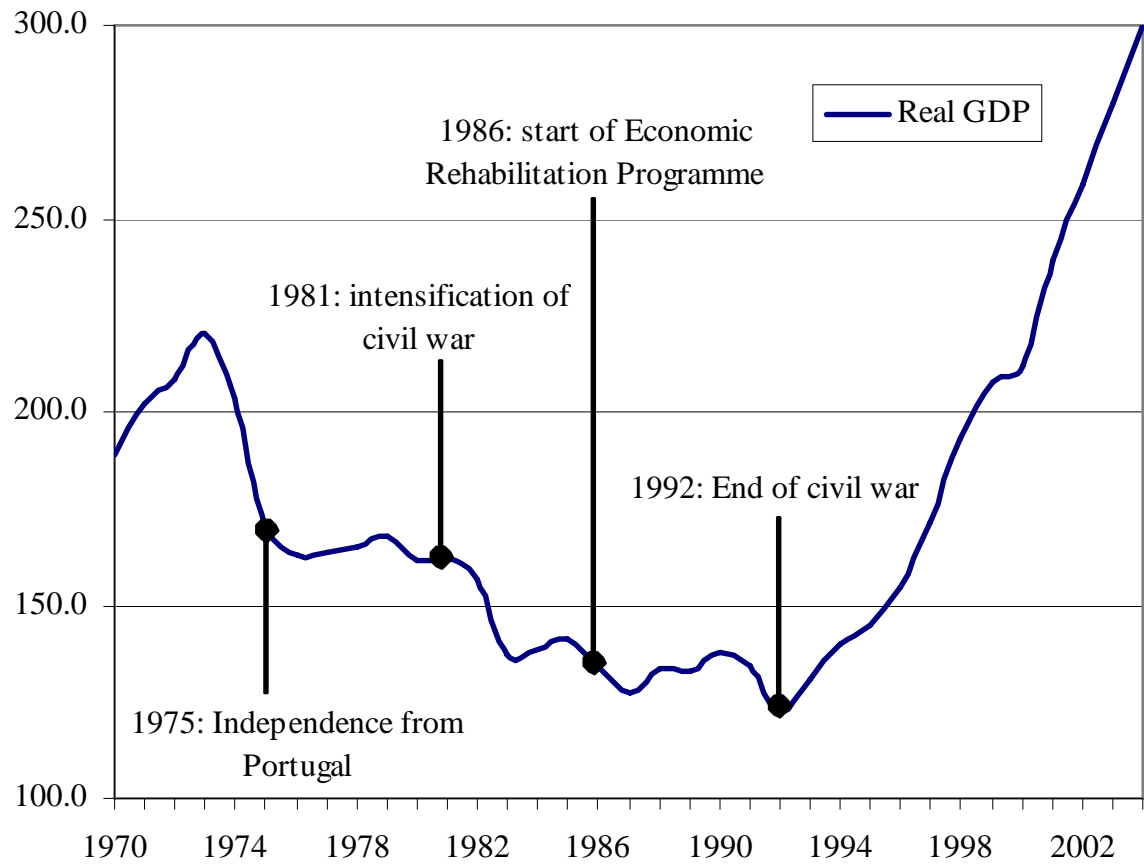
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Figure 1: Real GDP, Mozambique, 1970 to 2004

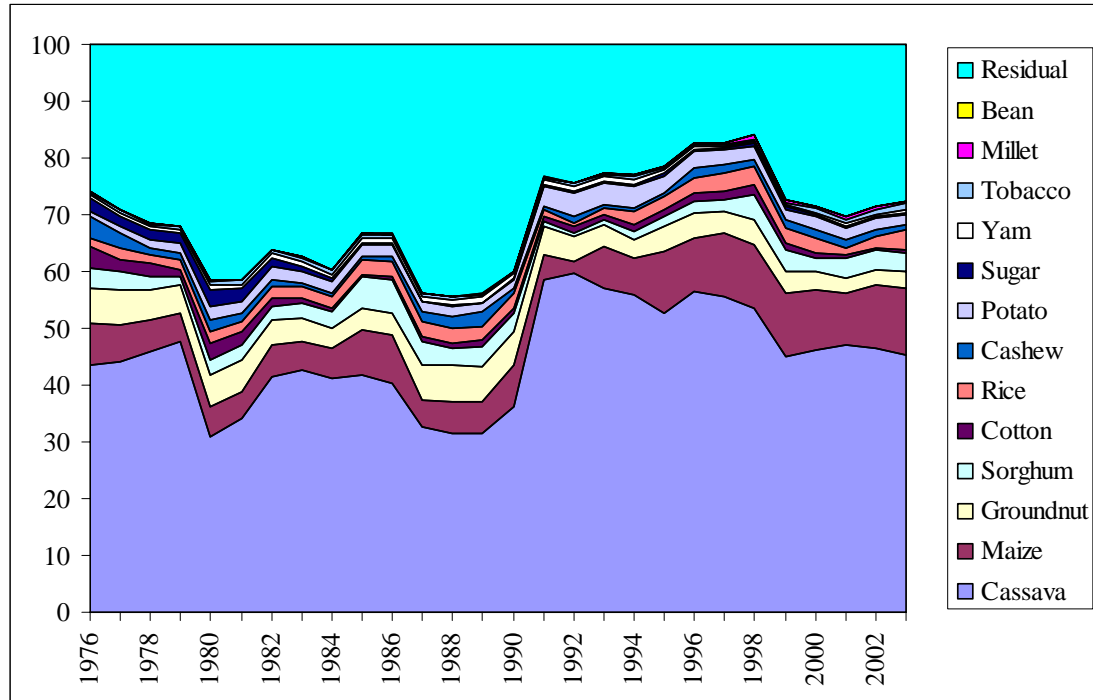
(billion Mt at 1980 constant prices)



Source: Arndt, Jones and Tarp (2006)

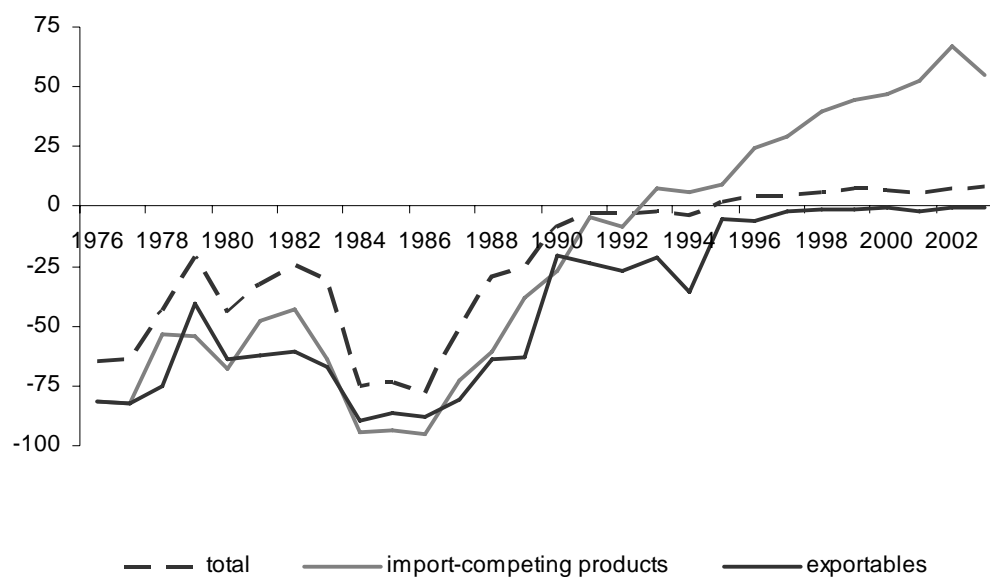
Figure 2: Shares of covered products in the value of primary agricultural production, Mozambique, 1976 to 2003

(percent, at distorted prices)



Source: Authors' compilation using FAO price and quantity data.

Figure 3: Nominal rates of assistance to exportables, import-competing and all<sup>a</sup> agricultural products, Mozambique, 1976 to 2003  
(percent)

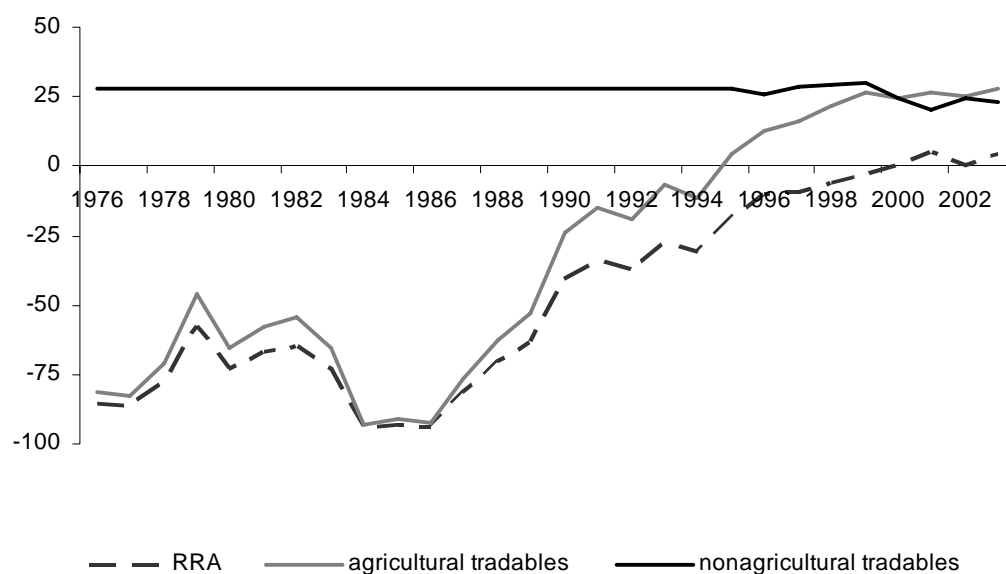


Source: Authors' spreadsheet

a. The total NRA can be above or below the exportable and import-competing averages because assistance to nontradables and non-product specific assistance is also included.



Figure 4: Nominal rates of assistance to all nonagricultural tradables, all agricultural tradable industries, and relative rates of assistance<sup>a</sup>, Mozambique, 1976 to 2003 (percent)



Source: Authors' spreadsheet

a. The RRA is defined as  $100 * [(100 + NRA_{ag}^t) / (100 + NRA_{nonag}^t) - 1]$ , where  $NRA_{ag}^t$  and  $NRA_{nonag}^t$  are the percentage NRAs for the tradables parts of the agricultural and nonagricultural sectors, respectively.

Table 1: Nominal rates of assistance to covered products, Mozambique, 1976 to 2003  
(percent)

	1976-79	1980-84	1985-89	1990-94	1995-99	2000-03
<b>Import-competing products<sup>a, b</sup></b>	<b>-67.7</b>	<b>-63.6</b>	<b>-72.2</b>	<b>-5.2</b>	<b>29.5</b>	<b>55.4</b>
Rice	-67.3	-52.0	-75.6	-49.6	7.5	25.8
Maize South	-63.4	-54.9	-66.2	7.6	10.1	19.9
Bean	n.a.	n.a.	n.a.	26.0	43.9	50.6
Groundnut	-67.9	-67.9	-65.4	5.0	18.5	46.3
<b>Exportables<sup>a, b</sup></b>	<b>-70.0</b>	<b>-68.6</b>	<b>-76.4</b>	<b>-25.5</b>	<b>-3.1</b>	<b>-1.0</b>
Maize Centre	-55.6	-56.2	-61.8	0.0	0.0	0.0
Maize North	-55.6	-56.2	-61.8	0.0	0.0	0.0
Cashew	-85.6	-90.1	-90.3	-72.9	-13.8	-5.5
Cotton	-64.0	-63.8	-65.0	-1.4	-2.7	-2.4
Tobacco	-64.5	-58.0	-54.8	-31.6	-19.0	0.0
<b>Mixed trade status<sup>a</sup></b>						
Sugar	-59.8	-65.7	-65.8	18.9	90.5	101.8
<b>Nontradables</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Cassava	0	0	0	0	0	0
Millet	0	0	0	0	0	0
Potato	0	0	0	0	0	0
Sorghum	0	0	0	0	0	0
Yam	0	0	0	0	0	0
<b>Total of covered products<sup>a</sup></b>	<b>-48.5</b>	<b>-41.6</b>	<b>-51.4</b>	<b>-3.9</b>	<b>4.9</b>	<b>7.2</b>
Dispersion of covered products <sup>c</sup>	36.9	33.9	38.1	26.6	30.3	30.1
% coverage (at undistorted prices)	70	61	60	73	80	71

Source: Authors' spreadsheet

a. Weighted averages, with weights based on the unassisted value of production.

b. Mixed trade status products included in exportable or import-competing groups depending upon their trade status in the particular year.

c. Dispersion is a simple 5-year average of the annual standard deviation around the weighted mean of NRAs of covered products.

Table 2: Nominal rates of assistance to agricultural relative to nonagricultural industries, Mozambique, 1976 to 2003

	(percent)					
	1976-79	1980-84	1985-89	1990-94	1995-99	2000-03
Covered products	-48.5	-41.6	-51.4	-3.9	4.9	7.2
Non-covered products	0.0	0.0	0.0	0.0	0.0	0.0
All agricultural products	-42.8	-19.0	-38.3	-5.0	2.2	5.1
Trade bias index <sup>a</sup>	-0.05	0.08	0.38	-0.20	-0.25	-0.36
<i>Assistance to just tradables:</i>						
All agricultural tradables	-70.1	-67.3	-75.1	-15.4	16.3	26.0
All non-agricultural tradables	28.0	28.0	28.0	28.0	28.2	23.1
<b>Relative rate of assistance, RRA<sup>b</sup></b>	<b>-76.7</b>	<b>-74.4</b>	<b>-80.6</b>	<b>-33.9</b>	<b>-9.4</b>	<b>2.4</b>
<b>MEMO</b> , ignoring exchange rate distortions:						
NRA, all agric. products	-24.3	-12.7	-36.3	-3.6	2.2	5.1
RRA (relative rate of assistance) <sup>b</sup>	-60.1	-66.4	-75.8	-33.1	-9.4	2.3

Source: Authors' spreadsheet

a. Trade bias index is  $TBI = (1 + NRA_{agx}/100)/(1 + NRA_{agm}/100) - 1$ , where  $NRA_{agm}$  and  $NRA_{agx}$  are the average percentage NRAs for the import-competing and exportable parts of the agricultural sector.

b. The RRA is defined as  $100 * [(100 + NRA_{agt})/(100 + NRA_{nonagt}) - 1]$ , where  $NRA_{agt}$  and  $NRA_{nonagt}$  are the percentage NRAs for the tradables parts of the agricultural and non-agricultural sectors, respectively.

## **Appendix: Key quantity and price assumptions, data and sources**

### **ASSUMPTIONS**

#### **Price to wholesaler and CIF price adjustment**

In our calculations of the NRAs we use as the point of reference for the domestic price (*reference price*) what we call "*price to wholesaler*". This includes the price paid to farmer plus internal trade costs (storage and transport to relevant market). The margin of the wholesaler is not included so this is not the true wholesaler price. In order to compare such price with the international one, we inflate cif prices (border prices) with internal trade costs to bring the good to the same relevant market. Such price, again, does not include any margin for the distributor. Implicitly we are assuming that margins for wholesalers who are trading domestic goods are the same for wholesalers trading foreign goods so both margins eventually balance each other in the calculation of the NRAs and can be left aside.

#### **Seasonal and yearly prices**

For some products we computed NRAs using both seasonal and yearly price data. However, it has to be noticed that for aggregation (sector NRA and overall RRA) we use only seasonal NRAs.

#### **Value of production at reference price (undistorted) – Agricultural goods**

We first compute the "undistorted reference price" for each good  $i$  by dividing the reference price (see above) by  $(1 + \text{NRA}_i)$ . Due to lack of production and/or producer price data for some products (primary agriculture and lightly processed goods) for many years in our sample, we cannot compute production value at reference prices directly. In order to overcome this problem we first compute the shares of production (at reference price and by product) over total production for the available years. Then, we take the average shares of the products with missing data in the available years and assume this as their share in the years in which we do not have information. This results in "adjusted shares of production" that can be finally used as weights for the calculation of sector (IMP, EXP, NT) and total NRAs.

#### **NRA gaps**

Due to lack of data on either domestic prices or international prices we experience some gaps in our NRA calculations. In order to fill the gaps we take the median of neighbouring years (before and after - up to four years where possible). We decide not to use the simple average due to the fact that there are some negative NRAs among our results.

#### **Value of production – Non agricultural goods**

Values of production for non agricultural goods are not available so we use sector shares of GDP as a mean to compute weights for the calculation of non-agricultural NRA and overall RRA.

#### **Transmission factors**

We assume an equi-proportionate pass-through of distortion from the primary product to the farm gate level or to the processed good.

#### **NRAs for husked rice, sugar cane and seed cotton**

We do not compute NRAs for husked rice and cane sugar while we use Zimbabwe and Zambia prices of seed cotton (from Ndela and Robinson 2007 and Robinson, Govereh and

Ndela 2007) to compute a guesstimate of the NRA for seed cotton in Mozambique. The reason why we do not compute any NRA for sugar cane is because there is no independent production of this good in Mozambique since millers are directly producing all their sugar cane. Concerning rice, the processor described in our spreadsheet refers to a producer who outsources the operation of de-husking to small millers and then sells the processed rice directly. Producer and processor in this case coincide. Such a figure of producer/processor is the most common in the major producing areas of rice in Mozambique

## DATA SOURCES

**Production volume data** for agricultural products and lightly processed foods are from the Ministry of Agriculture of Mozambique (*Departamento de Aviso Previo* and *Direcção Nacional de Agricultura*), the National Institute of Sugar, the National Institute of Cotton (IAM), The National Institute of Cashew (INCAJU) and FAOSTAT (2006) (Food and Agriculture Organization Statistics Database).

**Export and import volume data** are from Customs of Mozambique (TIMS database), UN COMTRADE (Commodity Trade Statistics) (2006) and FAOSTAT (2006).

**Farm-gate product prices** are from the Ministry of Agriculture of Mozambique (*Estatísticas Agrárias* and *SIMA – Sistema de Informação de Mercados Agrícolas*), the Ministry of Finance of Mozambique and FAOSTAT (2006). For cotton, cottonseed prices are average producer prices from Zimbabwe and Zambia (Ndela and Robinson 2007)

**Wholesale product prices.** Computed by inflating producer price to internal transport cost and therefore not inclusive of any wholesaler margin (see Value of production at reference price – Agricultural goods) above. Internal transport costs data are from Cirera and Arndt (2006).

**Intermediate input prices and input-output value coefficients.** There are no data available on intermediate input prices. Input-output coefficients are from the Ministry of Agriculture.

**Border prices.** Fob and Cif prices are calculated from export unit values and import unit values based on COMTRADE (2006) and FAOSTAT (2006). Cif price for brown sugar is derived from international price inflated by freight costs - data are from the National Institute of Sugar. We do not compute any quality adjustment.

**Exchange rates.** Official exchange rates are from World Development Indicators (WDI 2006). Parallel market rates are from IMF (2005). Parallel exchange rates are assumed to be the black market rates from 1980 to 1993, as reported in International Currency Analysis (1993 and earlier years) and reproduced as premia in Easterly (2006); before 1980 multiple exchange rates operated and the rates for different product groups are reported in IMF (2005 and earlier years).

**Production, consumption, input and trade taxes and subsidies.** Taxes and subsidies data are from the National Institute of Sugar, the National Institute of Cotton (IAM), the National Institute of Cashew (INCAJU), the Ministry of Finance of Mozambique and Customs of Mozambique (*Alfandegas*).

Appendix Table 1: Agricultural production, Mozambique, 1975 to 2005

(kt)

Product	Source	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Beans (a)	MINAG															
Sugar Cane	INA	2297.8	2079.6	1917.9	2125.1	2074.7	1719.3	1822.9	1505.8	875.9	490.7	277.8	194.3	227.8	220.6	255.4
Brown Sugar	INA	231.7	216.1	182.9	215.9	203.8	170.4	169.7	125.7	73.7	39.3	23.6	16.3	19.4	19.2	24.9
Cashew nut (raw)	FAO	122.0	91.5	61.0	66.0	71.1	71.1	61.0	35.6	20.3	25.0	30.0	35.0	45.0	50.2	22.5
Cashew nut (shelled)	FAO															
Cottonseed	IAM	36.8	52.9	72.4	30.6	64.8	73.5	60.4	24.8	19.7	5.2	10.7	28.3	5.6	28.1	30.6
Cotton lint	FAO and IAM	39.0	28.0	17.0	24.0	13.0	21.0	24.0	18.0	8.0	7.0	1.0	4.0	9.0	7.0	9.0
Groundnut in shell	FAO	140.0	130.0	130.0	125.0	130.0	133.0	130.0	120.0	110.0	100.0	100.0	101.0	105.0	110.0	110.0
Groundnut shelled	FAO	98.0	91.0	91.0	87.5	91.0	93.1	91.0	84.0	77.0	70.0	70.0	70.7	73.5	77.0	77.0
Maize	FAO	250.0	450.0	430.0	420.0	400.0	380.0	370.0	350.0	330.0	350.0	400.0	459.0	271.0	322.0	330.0
Cassava	FAO	3250.0	3300.0	3350.0	3400.0	3500.0	3600.0	3600.0	3650.0	3700.0	3700.0	3600.0	3600.0	3700.0	3600.0	3700.0
Rice (paddy)	FAO	101.0	45.0	68.0	52.0	70.0	75.0	78.0	80.0	82.0	84.0	86.0	93.0	90.0	93.0	95.0
Rice (milled)	FAO	67.4	30.0	45.4	34.7	46.7	50.0	52.0	53.4	54.7	56.0	57.4	62.0	60.0	62.0	63.4
Tea	FAO	13.1	13.8	17.0	18.1	18.9	19.5	22.2	21.0	15.0	11.0	7.0	5.0	3.0	1.5	2.5
Product	Source	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Beans (a)	MINAG				95.3	134.2	140.6	152.8	191.1	188.6	146.4	155.9	177.4	179.6	192.8	
Sugar Cane	INA	331.6	252.8	151.1	184.5	234.0	313.2	315.9	278.9	368.7	469.5	397.3	675.6	1586.3	1940.8	1873.3
Brown Sugar	INA	31.7	24.6	13.2	15.6	19.2	28.4	29.3	25.2	38.6	50.7	39.0	67.3	171.1	212.2	205.1
Cashew nut (raw)	FAO	31.1	54.2	23.9	23.0	33.4	66.5	43.3	51.7	58.7	57.9	58.0	58.0	58.0	58.0	58.0
Cashew nut (shelled)	FAO		124.8	154.4	68.1	73.5	123.6	144.0	132.0	130.5	84.8	0.0	32.6	27.0	15.6	16.6
Cottonseed	IAM	40.1	34.6	47.0	46.3	53.0	50.5	74.0	91.1	116.7	35.4	71.0	84.7	54.1	93.2	78.7
Cotton lint	FAO and IAM	8.0	13.2	16.4	15.5	16.7	17.0	17.0	23.9	30.0	30.0	11.3	24.0	25.0	25.0	27.7
Groundnut in shell	FAO	113.0	115.0	67.3	101.0	83.0	108.3	122.5	116.6	124.2	283.5	129.1	127.4	115.2	109.9	127.5
Groundnut shelled	FAO	79.1	80.5	61.0	58.8	51.8	71.4	81.9	88.4	100.1	102.9	80.2	76.5	76.9	76.9	
Maize	FAO	452.9	327.1	132.1	533.1	489.5	734.0	947.0	1042.0	1123.9	1246.1	1019.0	933.9	1235.6	1247.9	1437.0
Cassava	FAO	4590.4	3690.5	3238.9	3511.2	3351.6	4178.0	4734.0	5336.7	5639.0	5352.8	5362.0	5988.3	5924.6	6149.9	6412.8
Rice (paddy)	FAO	96.4	56.3	32.6	65.6	101.2	113.0	139.0	180.2	191.0	186.2	151.4	168.1	167.9	200.4	177.4
Rice (milled)	FAO	64.3	37.6	21.8	43.8	67.5	75.4	92.7	120.2	127.4	124.2	101.0	112.1	112.0	133.7	
Tea	FAO	4.0	4.9	1.0	1.7	2.0	1.0	1.7	1.5	1.5	1.6	10.5	10.5	10.5	10.5	10.5

Source: FAO and MINAG

Appendix Table 2: Annual distortion estimates, Mozambique, 1976 to 2003

(a) Nominal rates of assistance to covered products<sup>a</sup>

	(percent)										All covered <sup>a</sup>
	Bean	Cashew	Cotton	Ground nut	Maize Centre	Maize North	Maize South	Rice	Sugar	Tobacco	
1976	na	-79	-79	-79	-86	-86	-86	-85	-80	-78	-64
1977	na	-92	-85	-82	-74	-74	-83	-82	-79	-80	-64
1978	na	-86	-43	-53	-88	-88	-50	-56	-44	-53	-44
1979	na	-85	-50	-58	25	25	-35	-45	-36	-46	-21
1980	na	-90	-48	-74	-62	-62	-52	-46	-58	-27	-45
1981	na	-90	-53	-49	-48	-48	-46	-46	-58	-45	-33
1982	na	-82	-52	-51	-56	-56	-29	-26	-58	-51	-25
1983	na	-89	-69	-71	-57	-57	-53	-48	-61	-71	-31
1984	na	-99	-97	-95	-57	-57	-94	-94	-93	-95	-75
1985	na	-98	-97	-95	-57	-57	-91	-91	-94	-96	-74
1986	na	-99	-96	-96	-57	-57	-94	-93	-96	-70	-79
1987	na	-98	-80	-77	-72	-72	-64	-67	-49	-54	-50
1988	na	-79	-53	-63	-59	-59	-42	-64	-43	-35	-30
1989	na	-76	0	5	-63	-63	-40	-63	-47	-18	-25
1990	na	-75	0	5	0	0	8	-51	-38	-52	-8
1991	na	-65	0	5	0	0	8	-43	36	-56	-3
1992	na	-58	0	5	0	0	8	-59	31	6	-3
1993	26	-79	-3	5	0	0	8	-49	31	-44	-2
1994	26	-88	-3	5	0	0	8	-46	34	-12	-4
1995	26	-33	-3	5	0	0	8	-40	6	-33	2
1996	42	-15	-3	8	0	0	8	13	40	-62	4
1997	42	-9	-2	8	0	0	8	13	152	0	5
1998	58	-7	-2	20	0	0	8	26	146	0	6
1999	52	-4	-2	52	0	0	20	26	108	0	8
2000	52	-1	-2	46	0	0	20	26	94	0	7
2001	52	-12	-2	46	0	0	20	26	97	0	6
2002	52	-5	-2	46	0	0	20	26	114	0	8
2003	46	-4	-2	46	0	0	20	26	102	0	8

a. Cassava, millet, potato, sorghum and yam are assumed to have a zero NRA for the studied period, and are included in the NRA weighted average for covered products.

Appendix Table 2 (continued): Annual distortion estimates, Mozambique, 1976 to 2003  
 (b) Nominal and relative rates of assistance to all<sup>a</sup> agricultural products, to exportable<sup>b</sup> and import-competing<sup>b</sup> agricultural industries, and relative<sup>c</sup> to non-agricultural industries  
 (percent)

(percent)					Ag tradables NRA	Non-ag tradables NRA	RRA
Total ag NRA							
Covered products		Non-covered products	All products (incl NPS)				
Inputs	Outputs						
1976	0	-64	0	-48	-81	28	-85
1977	0	-64	0	-48	-83	28	-86
1978	0	-44	0	-46	-71	28	-77
1979	0	-21	0	-30	-46	28	-58
1980	0	-45	0	-14	-66	28	-73
1981	0	-33	0	-26	-58	28	-67
1982	0	-25	0	-19	-55	28	-64
1983	0	-31	0	-16	-65	28	-73
1984	0	-75	0	-20	-93	28	-95
1985	0	-74	0	-45	-91	28	-93
1986	0	-79	0	-49	-92	28	-94
1987	0	-50	0	-52	-77	28	-82
1988	0	-30	0	-28	-62	28	-71
1989	0	-25	0	-16	-53	28	-63
1990	0	-8	0	-14	-24	28	-41
1991	0	-3	0	-5	-15	28	-34
1992	0	-3	0	-2	-19	28	-37
1993	0	-2	0	-2	-7	28	-27
1994	0	-4	0	-1	-12	28	-31
1995	0	2	0	-3	4	28	-18
1996	0	4	0	2	12	26	-10
1997	0	5	0	3	16	28	-9
1998	0	6	0	4	22	30	-6
1999	0	8	0	5	26	30	-3
2000	0	7	0	6	24	24	0
2001	0	6	0	5	27	20	5
2002	0	8	0	4	25	24	0
2003	0	8	0	6	28	23	4

a. NRAs including assistance to nontradables and non-product specific assistance.

b. NRAs including products specific input subsidies.

c. The Relative Rate of Assistance (RRA) is defined as  $100 \cdot [(100 + \text{NRA}_{\text{ag}}^t) / (100 + \text{NRA}_{\text{nonag}}^t) - 1]$ , where  $\text{NRA}_{\text{ag}}^t$  and  $\text{NRA}_{\text{nonag}}^t$  are the percentage NRAs for the tradables parts of the agricultural and non-agricultural sectors, respectively.



Appendix Table 2 (continued): Annual distortion estimates, Mozambique, 1976 to 2003

(c) Value shares of primary production of covered<sup>a</sup> and non-covered products,

	(percent)									
	Rice	Maize South	Ground nut	Maize Centre	Maize North	Cashew	Cotton	Tobacco	Sugar	Cassava
1976	4	2	9	6	7	6	3	1	21	14
1977	4	2	11	3	4	11	5	1	14	14
1978	2	1	6	10	11	3	1	1	9	23
1979	3	1	9	1	1	4	2	1	10	34
1980	2	1	11	4	4	5	3	1	9	15
1981	2	1	7	2	3	5	3	1	9	22
1982	2	1	7	4	4	3	1	1	6	31
1983	3	1	10	3	4	3	1	1	4	29
1984	9	3	20	1	1	6	1	2	4	10
1985	9	4	21	2	3	8	3	2	2	10
1986	10	5	19	2	2	12	4	1	2	8
1987	4	1	13	5	5	6	1	1	1	16
1988	4	1	8	4	4	4	1	0	1	25
1989	5	1	3	5	5	4	1	0	2	25
1990	5	1	3	3	3	2	1	1	2	34
1991	2	1	3	3	2	2	1	1	1	56
1992	1	0	3	1	1	3	1	0	0	58
1993	2	1	3	3	3	2	1	1	1	51
1994	3	1	3	1	3	4	1	0	1	48
1995	3	2	5	4	4	1	1	0	1	40
1996	3	2	4	2	3	2	2	0	1	51
1997	na	2	4	3	3	1	2	0	0	55
1998	na	2	5	3	3	1	2	1	0	52
1999	5	0	4	2	3	2	0	1	1	44
2000	1	1	3	2	2	2	1	1	1	47
2001	1	1	3	2	2	1	1	1	1	47
2002	na	1	2	5	5	1	1	2	2	43
2003	na	2	2	3	5	1	1	0	3	45

Appendix Table 2 (continued): Annual distortion estimates, Mozambique, 1976 to 2003  
(c) Value shares of primary production of covered<sup>a</sup> and non-covered products,  
(percent)

	Beans	Millet	Potato	Sorghum	Yam	Non-covered
1976	na	0	0	1	0	26
1977	na	0	0	1	0	29
1978	na	0	1	1	0	32
1979	na	0	1	1	0	32
1980	na	0	1	1	0	42
1981	na	0	1	2	0	41
1982	na	0	2	2	1	36
1983	na	0	1	2	1	37
1984	na	0	1	1	0	40
1985	na	0	1	1	0	33
1986	na	0	0	1	0	33
1987	na	0	1	2	0	44
1988	na	0	1	2	1	44
1989	na	0	1	3	1	44
1990	na	0	1	3	1	40
1991	na	0	4	1	1	23
1992	na	0	4	1	1	24
1993	5	0	3	1	1	23
1994	6	0	3	1	1	23
1995	11	0	2	1	0	22
1996	7	0	3	2	1	17
1997	7	0	2	2	1	17
1998	6	1	2	4	0	16
1999	4	1	2	4	0	27
2000	4	0	2	2	0	28
2001	3	1	2	4	0	30
2002	3	0	2	3	0	28
2003	5	0	2	3	0	28

Source: Authors's spreadsheet

a. At farmgate undistorted prices

Appendix Table 3: Harvest and commercialization periods, Mozambique

	<b>Harvest</b>	<b>Commercialization</b>
Beans	April-May March-June	March-July
Cassava	All year	All year
Cashew	October-January <i>North</i> November-February <i>South</i>	October-February
Rice	March-May <i>South</i> May-July <i>Center-North</i>	March-August
Groundnut	April-May	April-June
Maize	March-June	March-July
Cotton	June-July	June-July
Sugar	April-December	April-January

Source: Authors' own elaboration

Appendix Table 4: Evolution of fixed and minimum prices for selected products, Mozambique, 1975 to 2005

	1975 - 1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997- 2002	2003- 2005
<b>Maize</b>	Fixed	Fixed	Fixed	Fixed	Min	Min	Min	Min	Min	Min	Lib	Lib	Lib
<b>Rice</b>	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Lib	Lib	Lib
<b>Beans butter</b>	Fixed	Fixed	Fixed	Min	Min	Min	Min	Min	Min	Min	Min	Lib	Lib
<b>Beans nhemba</b>	Fixed	Fixed	Fixed	Min	Min	Min	Min	Min	Min	Min	Min	Lib	Lib
<b>Groundnuts</b>	Fixed	Fixed	Fixed	Min	Min	Min	Min	Min	Min	Min	Lib	Lib	Lib
<b>Cassava</b>	Fixed	Fixed	Fixed	Lib	Lib	Lib	Lib	Lib	Lib	Lib	Lib	Lib	Lib
<b>Cashew</b>	Fixed	Fixed	Fixed	Min	Min	Min	Min	Min	Min	Min	Min	Lib	Lib
<b>Sugar</b>	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Lib	Distrib
<b>Cotton</b>	Fixed	Fixed	Fixed	Min	Min	Min	Min	Min	Min	Min	Min	Min	Min
<b>Tea</b>	Fixed	Prod	Prod	Prod	Prod	Lib	Lib	Lib	Lib	Lib	Lib	Lib	Lib
<b>Tobacco</b>	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Lib	Lib

Fixed: fixed at all levels; Prod - determined by producers on the basis of production costs; Min – minimum producer price and fixed consumer price; Lib – liberalized at all levels; Distrib – established by distributor

Source: Authors' own elaboration

Appendix Table 5: Exchange rates, Mozambique, 1975 to 2004

(local currency per US dollar)

	Official rate	Secondary/ parallel market rate	Retention rate <sup>a</sup>	Discount to secondary market rate	Estimated equilibrium exchange rate using this study's methodology <sup>b</sup>
1975	26	245	0.50	245	190
1976	30	287	0.50	287	223
1977	33	305	0.50	305	237
1978	33	102	0.50	102	85
1979	33	81	0.50	81	69
1980	32	78	0.50	78	67
1981	35	73	0.50	73	64
1982	38	98	0.50	98	83
1983	40	155	0.50	155	126
1984	42	1400	0.50	1400	1061
1985	43	1817	0.50	1817	1373
1986	40	1984	0.50	1984	1498
1987	291	1096	0.50	1096	895
1988	525	1183	0.50	1183	1018
1989	745	1933	0.50	1933	1636
1990	929	2155	0.50	2155	1849
1991	1434	2194	0.50	2194	2004
1992	2517	2894	0.50	2894	2800
1993	3874	4500	0.50	4500	4344
1994	6039	6679	0.50	6679	6519
1995	9024	9611	0.50	9611	9464
1996	11294	11909	0.50	11909	11755
1997	11544	11708	0.50	11708	11667
1998	11875	12057	0.50	12057	12011
1999	12775	12844	0.50	12844	12827
2000	15227	15996	0.50	15996	15804
2001	20704	21139	0.50	21139	21030
2002	23678	24281	0.50	24281	24130
2003	23782	24226	0.50	24226	24115
2004	22581	23166	0.50	23166	23020

<sup>a</sup> The proportion of foreign currency actually sold by all exporters at the parallel market rate.<sup>b</sup> See Anderson et al. (2008) on the exchange rate methodology used in this study